

Centering Tool for Hardened Steels

DN2HC-ATH



MOLDINO Tool Engineering Europe GmbH

Tool for NC centering, chamfering and slotting of high-hardened steels.

Features of DN2HC-ATH

01 Thinning provides good biting properties.

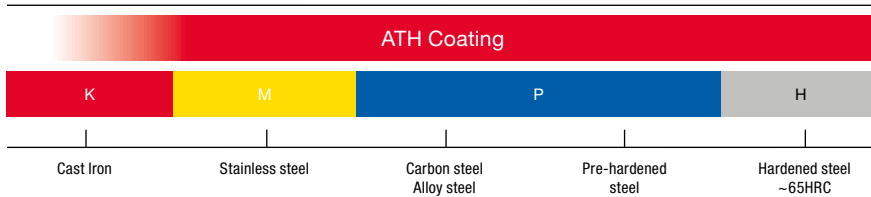
02 Blunt-angled tip and optimized edge shape for high defect resistance and outstanding cutting capabilities.

03 ATH coating provides long tool life, even in high-hardened steels

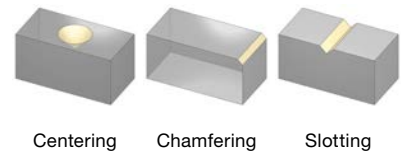
Line-up: 7 items
DC: 3–16 mm



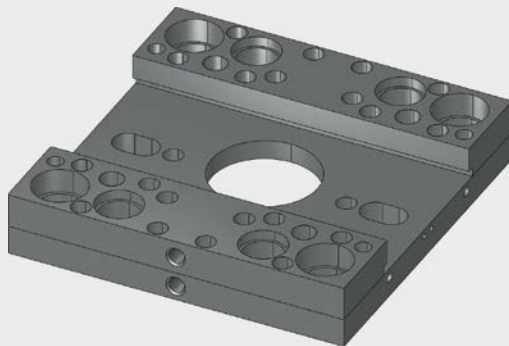
Recommended usage



Applications



Customer Need and Product Benefit



Centering guarantees more precise guidance and higher process safety for subsequent drilling processes.

Chamfering is one of the most often used – and also underrated – mechanical cutting operation influencing overall lead times.

Challenge

Manual processing and limited availability of NC Spot Drills for high-hardened steels.

Proposal

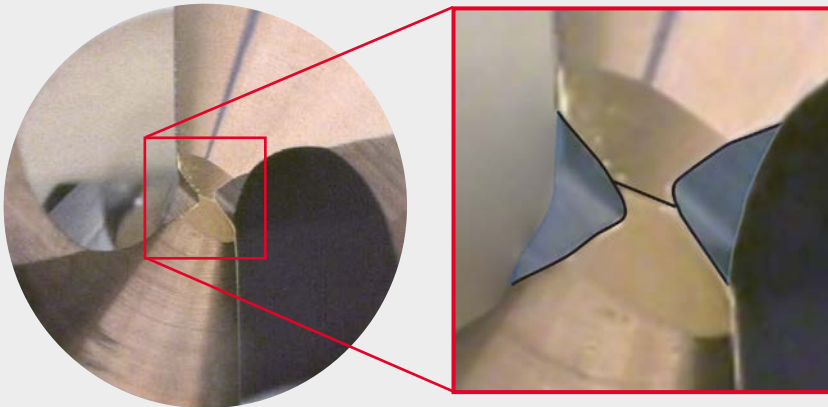
Centering and Chamfering with DN2HC

- Improved Guidance Precision
- Improved and consistent surface quality
- Reduced processing time and cost
- Enhanced process safety and tool life

Features

01

Thinning for good biting properties.

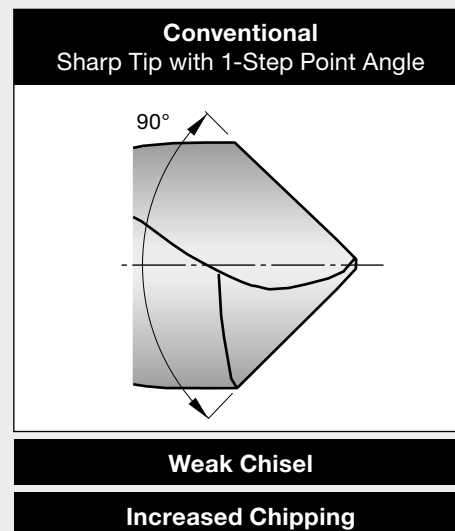
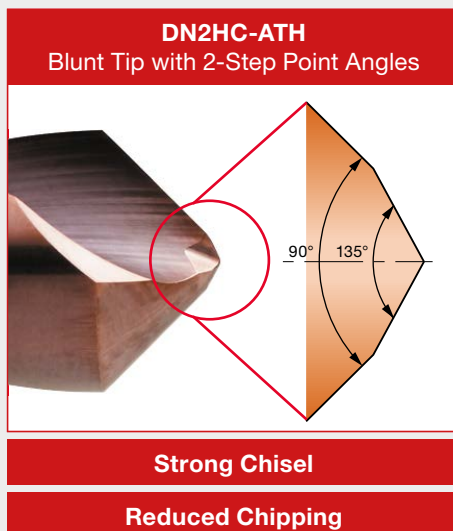

Thinning:

- Exact Centering
- Effective Chip Removal
- Reduced Chipping

Features

02

Blunt-angled tip for high defect resistance.



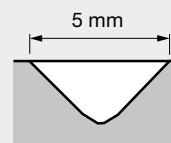
Example

01

Cutting Performance in 60 HRC


DN2HC-ATH IN SKD11 (~1.2379) with 60 HRC

- 576 holes with uniform surface
- No chipping or breakouts
- Still good to use, because of ATH Coating



Picture shows tool and surface after 576 centerings.

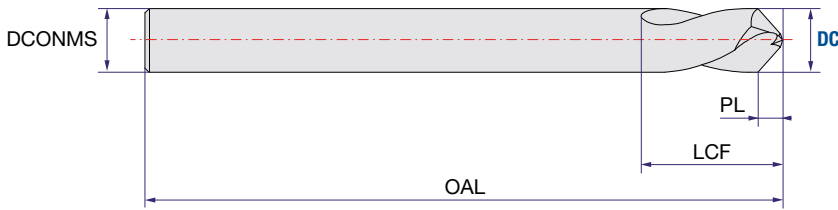
Process	Tool	Material	DC	n	V _e	V _i	f	Cooling
			(mm)	(min ⁻¹)	(m/min)	(mm/min)	(mm/min)	
Centering Top D5	DN2HC-0600-ATH	SKD11	6	1,592	30	95	0.06	Wet

DN2HC-ATH

65 HRC
ATH coated
90°
h7
2 flutes
Carbide

P
M
K

N
S
H

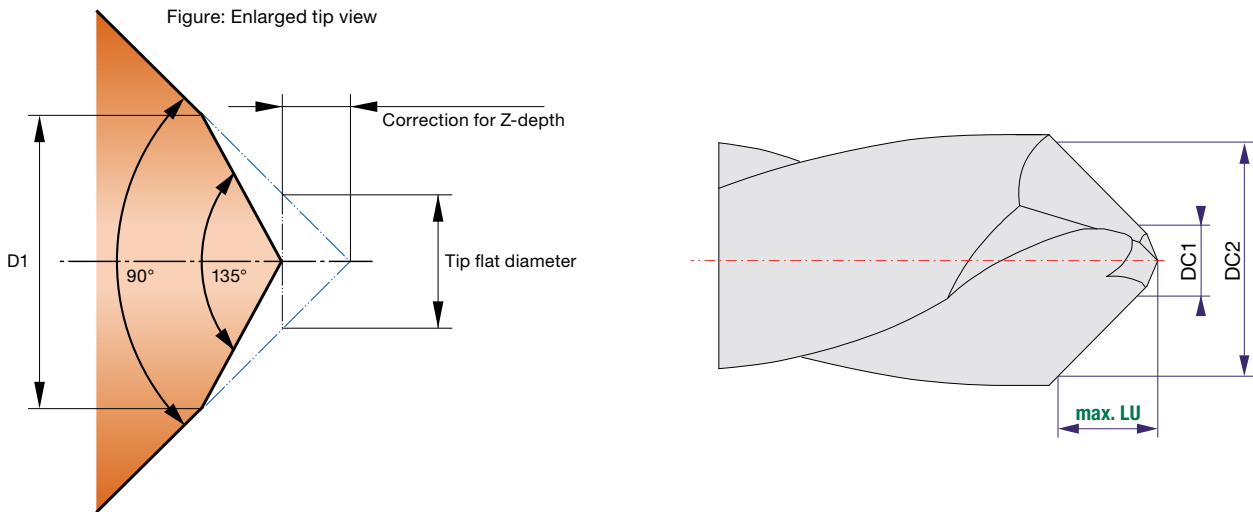


ID Code	Item Code	Stock	Size (mm)				
			DC	PL	LCF	OAL	DCONMS
CD1043	DN2HC-0300-ATH	●	3	1.3	9	45	3
CD1044	DN2HC-0400-ATH	●	4	1.7	12	50	4
CD1045	DN2HC-0600-ATH	●	6	2.6	15	66	6
CD1046	DN2HC-0800-ATH	●	8	3.4	20	74	8
CD1047	DN2HC-1000-ATH	●	10	4.3	24	84	10
CD1048	DN2HC-1200-ATH	●	12	5.1	28	95	12
CD1049	DN2HC-1600-ATH	●	16	6.8	35	113	16

● Stock Item

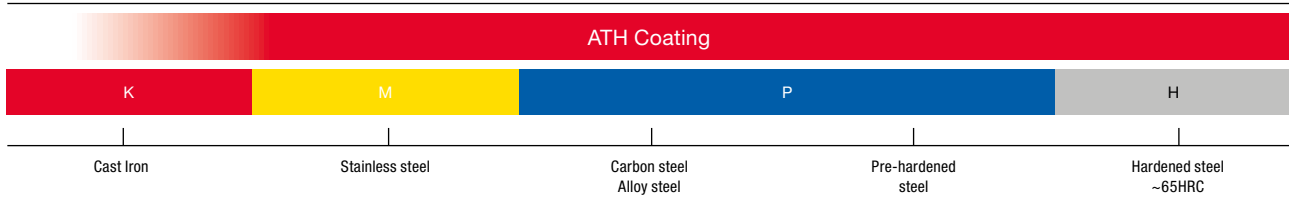
Reference sizes of tool tip

For creating machining programs and defining tool shapes in CAM.

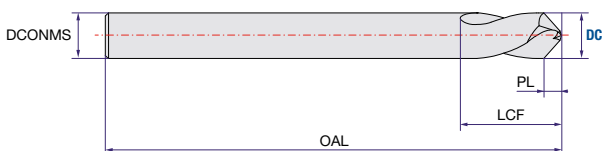


ID Code	Item Code	DC	Reference size (mm)			Dimensions of Usability for Chamfering (mm)		
			D1	Tip flat diameter	Correction for Z-depth	max. LU	DC1	DC2
CD1043	DN2HC-0300-ATH	3	0.70	0.4	0.2	1.2	0.75	2.8
CD1044	DN2HC-0400-ATH	4	0.95	0.6	0.3	1.6	1.00	3.8
CD1045	DN2HC-0600-ATH	6	1.40	0.8	0.4	2.4	1.50	5.6
CD1046	DN2HC-0800-ATH	8	1.90	1.2	0.6	3.2	2.00	7.6
CD1047	DN2HC-1000-ATH	10	2.40	1.4	0.7	4.1	2.50	9.6
CD1048	DN2HC-1200-ATH	12	2.90	1.8	0.9	4.9	3.00	11.6
CD1049	DN2HC-1600-ATH	16	3.90	2.4	1.2	6.6	4.00	15.6

DN2HC-ATH General Technical Information



ISO 513 Symbol	Description	Examples
P	Non-alloy steel, low alloy steel, high alloy steel, ferritic/martensitic stainless steel, tool steel	1.2343 / X38CrMoV5-1; 1.2738 / 40CrMnNiMo8; 1.0503 / C45; 1.0570 / ST52-3; 1.1730 / C45W; 1.7131 / 16MnCr5; 1.7225 / 42CrMo4; 1.3343 / HS6-5-2; 1.0511 / C40; 1.2312 / 40CrMnMoS8-6; 1.2311 / 40CrMnMo7; 1.2344 / X40CrMoV5-1; 1.2767 / X45NiCrMo4; 1.2083 / X42Cr13; 1.2085 / X33CrS16; 1.2714 / 55NiCrMoV7; 1.2842 / 90MnCrV8
M	Austenitic stainless steel	1.4301 / X5CrNi18-9; 1.4401 / X5CrNiMo17-12-2; 1.4404 / X2CrNiMo17-13-2; 1.4828 / X15CrNiSi20 12
K	Grey cast iron (GG), Nodular cast iron (GGG), Malleable cast iron	0.6025 / GG-25; GGG-40.3; 0.8155 / GTS-55-04
N	Aluminum wrought all, Copper alloy, Aluminum-cast, alloyed, Non-metallic	2.0060 / E-Cu57; 2.0321 / CuZn37; 3.0255 / Al99.5; 3.5103 / MgSE3Zn27r1
S	High temperature alloys, Titanium and Ti alloys	1.4864 / X12NiCrSi36 16; 2.4856 / NiCr22Mo9Nb; 1.4977 / X40CoCrNi20 20; 2.4669 / NiCr15Fe7TiAl
H	Hardened steel, Chilled cast iron, Cast iron	



Rotations per Minute (rpm)

$$n = \frac{V_c \cdot 1000}{\pi \cdot DC}$$

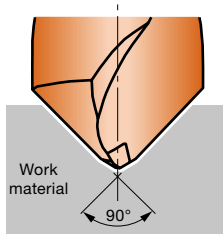
Feed Rate (mm/min)

$$V_f = n \cdot z \cdot f_z$$

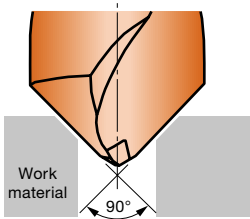
Drawing Nomenclature (mm)	
DC	Diameter Cutting
DCONMS	Connection Diameter
PL	Point Length
LCF	Length Chip Flute
OAL	Overall Length

Cutting Parameters	
a_e	Radial Depth of Cut (mm)
a_p	Axial Depth of Cut (mm)
f_z	Feed per Tooth (mm)
n	Revolutions per Minute (rpm)
V_c	Cutting Speed (m/min)
V_f	Feed Rate (mm/min)
z	Number of Teeth

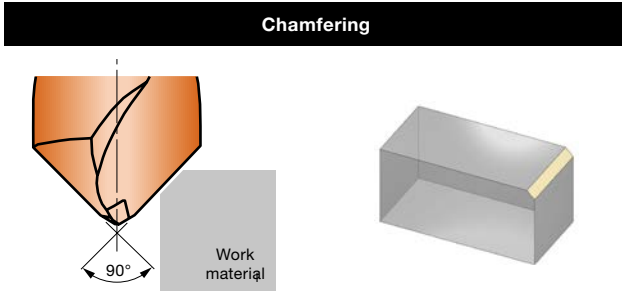
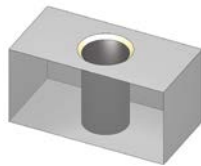
DN2HC-ATH Recommended Cutting Conditions



Centering



Countersinking

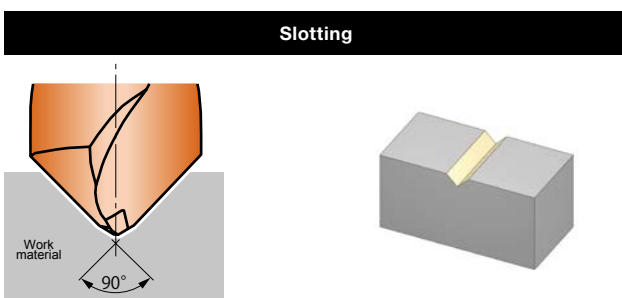


Chamfering



$C = DC \times 20\%$ is used as a general guideline for cutting conditions.

Adjust by decreasing the rotation speed and feed rate if $C > DC \times 20\%$.



Slotting

For hardened steel, large cutting loads may prevent machining of max available depths in a single operation.

Make adjustments: For example, machining the groove depth in two operations, referring to max available depth ratios.

Workpiece Material	Structural steel Carbon steel Alloy steel <30 HRC			Pre-hardened steel 30-40 HRC		
	50-80-120			40-60-80		
Vc (m/min)	n	V _f	f	n	V _f	f
DC (mm)	min ⁻¹	mm/min	mm/rev	min ⁻¹	mm/min	mm/rev
3	8500	510	0.06 0.04-0.08	6400	320	0.05 0.03-0.07
4	6400	384	0.06 0.04-0.08	4800	240	0.05 0.03-0.07
6	4200	294	0.07 0.05-0.09	3200	192	0.06 0.04-0.08
8	3200	240	0.075 0.05-0.10	2400	144	0.06 0.04-0.08
10	2500	200	0.08 0.05-0.11	1900	124	0.065 0.04-0.09
12	2100	168	0.08 0.05-0.11	1600	104	0.065 0.04-0.09
16	1600	192	0.12 0.10-0.14	1200	96	0.08 0.06-0.10

Workpiece Material	Structural steel, Carbon steel, Alloy steel <30 HRC			Pre-hardened steel 30-50 HRC		
	150-225-300			100-165-250		
Vc (m/min)	n	V _f	f _z	n	V _f	f _z
DC (mm)	min ⁻¹	mm/min	mm/t	min ⁻¹	mm/min	mm/t
3	24000	1440	0.03 0.020-0.040	17500	875	0.025 0.015-0.035
4	18000	1080	0.03 0.020-0.040	13100	655	0.025 0.015-0.035
6	12000	840	0.035 0.025-0.045	8800	528	0.03 0.020-0.040
8	9000	675	0.0375 0.025-0.050	6600	396	0.03 0.020-0.040
10	7200	576	0.04 0.025-0.055	5300	345	0.0325 0.020-0.045
12	6000	480	0.04 0.025-0.055	4400	286	0.0325 0.020-0.045
16	4500	540	0.06 0.050-0.070	3300	264	0.04 0.030-0.050

Workpiece Material	Structural steel, Carbon steel, Alloy steel <30 HRC			Pre-hardened steel 30-40 HRC		
	100%			100%		
Max. available depth ratio	100%			100%		
Vc (m/min)	100-180-260			100-165-230		
DC (mm)	n	V _f	f _z	n	V _f	f _z
	min ⁻¹	mm/min	mm/t	min ⁻¹	mm/min	mm/t
3	19100	1146	0.03 0.020-0.040	17500	875	0.025 0.015-0.035
4	14300	858	0.03 0.020-0.040	13100	655	0.025 0.015-0.035
6	9600	672	0.035 0.025-0.045	8800	528	0.03 0.020-0.040
8	7200	540	0.0375 0.025-0.050	6600	396	0.03 0.020-0.040
10	5700	456	0.04 0.025-0.055	5300	345	0.0325 0.020-0.045
12	4800	384	0.04 0.025-0.055	4400	286	0.0325 0.020-0.045
16	3600	432	0.06 0.050-0.070	3300	264	0.04 0.030-0.050

SETTING OF CUTTING CONDITIONS

- Coolant is recommended for work materials of 40HRC or harder, stainless steel, and aluminium.
- These recommended cutting conditions are for general guidelines. Adjust cutting parameters for actual machining based on machining shape, purpose, machine used, and other factors.

- When attaching the tool, use a collet free of scratches or dirt. Keep tool runout to 0.02 mm or less.
- Secure the work material firmly to prevent deformation, deflection, and vibration.
- Watch for smoke and fire hazards posed by heated chips or tools.

DN2HC-ATH Recommended Cutting Conditions

	Pre-hardened steel 40-50 HRC			Cold working steel 50-60 HRC			High-speed steel 60-65 HRC			Stainless steel	Cast iron, Ductile cast iron			Aluminium, Copper		
V _c	30-40-50			20-30-40			10-20-30				40-60-100			50-100-150		
DC (mm)	n min ⁻¹	V _f mm/min	f mm/rev	n min ⁻¹	V _f mm/min	f mm/rev	n min ⁻¹	V _f mm/min	f mm/rev	n min ⁻¹	V _f mm/min	f mm/rev	n min ⁻¹	V _f mm/min	f mm/rev	
3	4200	168	0.04 0.02-0.06	3200	128	0.04 0.02-0.06	2100	84	0.04 0.02-0.06	6400	384	0.06 0.04-0.08	11000	660	0.06 0.04-0.08	
4	3200	128	0.04 0.02-0.06	2400	96	0.04 0.02-0.06	1600	64	0.04 0.02-0.06	4800	288	0.06 0.04-0.08	8000	480	0.06 0.04-0.08	
6	2100	126	0.06 0.04-0.08	1600	96	0.06 0.04-0.08	1100	66	0.06 0.04-0.08	3200	224	0.07 0.05-0.09	5300	371	0.07 0.05-0.09	
8	1600	96	0.06 0.04-0.08	1200	72	0.06 0.04-0.08	800	48	0.06 0.04-0.08	2400	180	0.075 0.05-0.10	4000	300	0.075 0.05-0.10	
10	1300	78	0.06 0.04-0.08	960	58	0.06 0.04-0.08	640	38	0.06 0.04-0.08	1900	152	0.08 0.05-0.11	3200	256	0.08 0.05-0.11	
12	1100	66	0.06 0.04-0.08	800	48	0.06 0.04-0.08	530	32	0.06 0.04-0.08	1600	128	0.08 0.05-0.11	2700	216	0.08 0.05-0.11	
16	800	64	0.08 0.06-0.10	600	48	0.08 0.06-0.10	400	32	0.08 0.06-0.10	1200	144	0.12 0.10-0.14	2000	240	0.12 0.10-0.14	

	Cold working steel 50-60 HRC			High-speed steel 60-65 HRC			Stainless steel			Cast iron, Ductile cast iron			Aluminium, Copper		
V _c	50-110-180			40-75-120			50-90-160			100-180-260			200-300-400		
DC (mm)	n min ⁻¹	V _f mm/min	f _z mm/t	n min ⁻¹	V _f mm/min	f _z mm/t	n min ⁻¹	V _f mm/min	f _z mm/t	n min ⁻¹	V _f mm/min	f _z mm/t	n min ⁻¹	V _f mm/min	f _z mm/t
3	12000	480	0.02 0.010-0.030	8000	320	0.02 0.010-0.030	9600	384	0.02 0.010-0.030	19100	1146	0.03 0.020-0.040	32000	1920	0.03 0.020-0.040
4	8800	352	0.02 0.010-0.030	6000	240	0.02 0.010-0.030	7200	288	0.02 0.010-0.030	14300	858	0.03 0.020-0.040	24000	1440	0.03 0.020-0.040
6	5800	348	0.03 0.020-0.040	4000	240	0.03 0.020-0.040	4800	288	0.03 0.020-0.040	9600	672	0.035 0.025-0.045	16000	1120	0.035 0.025-0.045
8	4400	264	0.03 0.020-0.040	3000	180	0.03 0.020-0.040	3600	216	0.03 0.020-0.040	7200	540	0.0375 0.025-0.050	12000	900	0.0375 0.025-0.050
10	3500	210	0.03 0.020-0.040	2400	144	0.03 0.020-0.040	2900	174	0.03 0.020-0.040	5700	456	0.04 0.025-0.055	9600	768	0.04 0.025-0.055
12	2900	174	0.03 0.020-0.040	2000	120	0.03 0.020-0.040	2400	144	0.03 0.020-0.040	4800	384	0.04 0.025-0.055	8000	640	0.04 0.025-0.055
16	2200	176	0.04 0.030-0.050	1500	120	0.04 0.030-0.050	1800	144	0.04 0.030-0.050	3600	432	0.06 0.050-0.070	6000	720	0.06 0.050-0.070

	Pre-hardened steel 40-50 HRC			Cold working steel 50-60 HRC			High-speed steel 60-65 HRC			Stainless steel	Cast iron, Ductile cast iron		Aluminium, Copper
Max. depth	90%			70%			50%				100%		
V _c	100-150-200			50-115-150			30-75-120				100-180-260		
DC (mm)	n min ⁻¹	V _f mm/min	f _z mm/t	n min ⁻¹	V _f mm/min	f _z mm/t	n min ⁻¹	V _f mm/min	f _z mm/t	n min ⁻¹	V _f mm/min	f _z mm/t	
3	16000	640	0.02 0.010-0.030	12000	480	0.02 0.010-0.030	8000	320	0.02 0.010-0.030	19100	1146	0.03 0.020-0.040	
4	12000	480	0.02 0.010-0.030	9200	368	0.02 0.010-0.030	6000	240	0.02 0.010-0.030	14300	858	0.03 0.020-0.040	
6	8000	480	0.03 0.020-0.040	6100	366	0.03 0.020-0.040	4000	240	0.03 0.020-0.040	9600	672	0.035 0.025-0.045	
8	6000	360	0.03 0.020-0.040	4600	276	0.03 0.020-0.040	3000	180	0.03 0.020-0.040	7200	540	0.0375 0.025-0.050	
10	4800	288	0.03 0.020-0.040	3700	222	0.03 0.020-0.040	2400	144	0.03 0.020-0.040	5700	456	0.04 0.025-0.055	
12	4000	240	0.03 0.020-0.040	3100	186	0.03 0.020-0.040	2000	120	0.03 0.020-0.040	4800	384	0.04 0.025-0.055	
16	3000	240	0.04 0.030-0.050	2300	184	0.04 0.030-0.050	1500	120	0.04 0.030-0.050	3600	432	0.06 0.050-0.070	

SETTING OF CUTTING CONDITIONS

- Coolant is recommended for work materials of 40HRC or harder, stainless steel, and aluminium.
- These recommended cutting conditions are for general guidelines. Adjust cutting parameters for actual machining based on machining shape, purpose, machine used, and other factors.
- When attaching the tool, use a collet free of scratches or dirt. Keep tool runout to 0.02 mm or less.
- Secure the work material firmly to prevent deformation, deflection, and vibration.
- Watch for smoke and fire hazards posed by heated chips or tools.

Attentions on Safety

1. Cautions regarding handling

- (1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.
- (2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

- (1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.
- (2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.
- (4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.
- (5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

- (1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.
- (2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.
- (3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

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For more details please check our digital tool database



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